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15. Supplementary Notes

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16. Abstract (MAXIMUM 200 WORDS)

In-situ burning (ISB) of oil in the marine environment is a viable alternative response technology, but it has been seldom used during actual responses due to lack of resources, incomplete plans, and health and safety concerns. The USCG recognized the need to develop an ISB operations manual to facilitate the effective use of ISB by spill response managers. The intent of the manual is to assist field personnel in managing, conducting, and monitoring successful ISB and to communicate the risks and benefits of this response method.

Development of the manual was based on proven technologies, approaches, and lessons learned from several recent field exercises conducted by the USCG, and years of field experience and testing. The manual makes extensive use of graphics, nomographs, photos, decision trees, checklists, matrices, and to-the-point advice.

The manual includes a summary Decision Guide for quick reference of key steps in making a "go/no-go" decision, and in assessing the information, equipment, and personnel requirements. Detailed descriptions of the feasibility of ISB for a given situation, the equipment involved in a successful burn, safety and risk factors including mitigating measures, and operational procedures are provided to support decision-making and operations.

17. Key Words	18. Distribution Statement
ISB, marine spills, in-situ burning, fire boom operations, fire-resistant boom, oil spill response	This document is available to the U.S. public through the National Technical Information Service, Springfield, VA 22161.

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EXECUTIVE SUMMARY

When oil is spilled in the marine environment, the traditional response has been to attempt to contain it with floating booms and recover it with skimmers. For large spills, this approach has seldom been very successful, in part due to the tremendous logistical difficulties in storing and handling the large volume of oil and water that is typically collected. Traditional recovery techniques are also inherently slow relative to the speed at which oil can spread to cover vast areas of the sea, and the speed at which the oil can move to threaten sensitive resources. In some spill situations, burning the oil in place is a viable alternative and offers several significant advantages over containment and recovery. This technique is commonly referred to as in-situ burning (ISB). The oil is first collected to create a burnable thickness and is then ignited using special igniters that can be deployed from a helicopter or a boat. Burning oil generates a tremendous amount of heat; specialized fire-resistant boom is required to contain it. Trained personnel and specialized equipment are required to perform the operation safely and effectively.

The main advantage of in-situ burning is the ability to quickly remove large amounts of oil from the marine environment. While it is not the answer to every oil spill problem, in some offshore spill scenarios ISB can provide a more efficient and more effective alternative to mechanical recovery by eliminating or greatly reducing the huge recovery, transport, disposal, and decontamination efforts. In full-scale field tests, removal efficiencies greater than 95 percent have been observed. Following a burn, a relatively inert residue remains that can usually be recovered using conventional mechanical means.

An obvious drawback to ISB is the large smoke plume that is generated. In general, however, the smoke plume is not a safety threat to the public nor to the environment because it has very low toxicity and readily dissipates. The burn or no-burn issue is essentially a trade-off and, in many situations, the environmental threats posed by the burning process will be much less than leaving the oil on the water surface.

ISB has been seldom used during actual responses due to misinformation, lack of resources, incomplete plans, and health and safety concerns. This ISB Operations Manual facilitates the effective use of ISB by spill response managers and operators in the offshore arena. It provides a summary of the principles governing oil combustion and the products generated from an ISB on water. It does not address burning on shore, near shore or in ice-covered waters. The manual consolidates all proven technologies, strategies, and knowledge. It does not delve into unproven methods or prototype equipment that are undergoing tests or evaluations. A Decision Guide is provided in Chapter 2 for quick assessments in determining if and how ISB technology may be used for a response operation. Chapters 3 through 6 and the appendices are provided to supplement the Decision Guide chapter with supporting information and more operational guidance when required. Facts are clearly defined and separated from the opinions of the authors. The risks and potential benefits of ISB are also covered. The manual focuses on organizations, procedures, and equipment that are required for ISB and readily available in the United States and its territories.

For ISB to be effective for a given oil spill, it must be implemented quickly before the limited window of opportunity closes. This duration of opportunity can be as small as several hours or extend to several days depending upon the oil and the environmental conditions. Planning, special equipment, and training specific to ISB must be in place before the spill. Regional Response Teams (RRTs) and local governmental approval agencies are encouraged to be involved in establishing pre-approved ISB zones to overcome some of these hurdles. This manual addresses confidence issues and political considerations in the somewhat intimidating fire-based response. This manual will allow the response community to take full advantage of ISB technology as another tool in its arsenal for improved spill response. If used effectively, ISB will serve to minimize environmental damage and human use impact resulting from large offshore oil spills.